

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-36 and 38-48 are presently active in this case, Claims 1, 8, 23 and 30 amended, Claim 37 canceled and Claims 44-48 added by way of the present amendment.

In the outstanding Official Action, Claims 8, 12, 15, 16 and 20-29 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,267,543 to David et al. or U.S. Patent No. 1,809,117 to Golden et al.; Claims 1-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Golden in view of U.S. Publication 2003/0180556 to Lynn; Claims 1-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over David in view of Lynn; Claims 6-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over David et al. in view of Lynn, and further in view of U.S. Patent No. 2,399,750 to Marty and U.S. Patent No. 3,136,017 to Preziosi; Claims 13-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over David et al. or Golden, and further in view of Marty and Preziosi; Claim 17 was rejected under 35 U.S.C. § 103(a) as being unpatentable over David et al. or Golden; Claims 9, 10, 11, 18, 19, 30-36 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over David et al. or Golden, and further in view of U.S. Patent No. 5,795,122 to Bowers or U.S. Publication No. 2003/0185653 to Csik et al.; Claims 37-39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over David et al. in view of Bowers and further in view of Lynn; Claims 40 and 43 were rejected under 35 U.S.C. § 103(a) as being unpatentable over David et al. in view of Bowers and further in view of U.S. Patent No. 3,460,210 to Ellis; and Claim 42 was rejected under 35 U.S.C. § 103(a) as being unpatentable over David et al. in view of Bowers and further in view of U.S. Patent No. 2,119,764 to and further in view of U.S. Patent No. 2,119,764 to Young.

First, Applicants wish to thank Examiner Sharp and Primary Examiner Saether for the March 21, 2004 personal interview, at which time the outstanding issues in this case were discussed. During the interview, Applicants presented amendments and arguments substantially as indicated in this response. While no agreement was reached, the Examiners did not react unfavorably to the amendments and arguments presented, but indicated that further consideration would be needed upon formal filing of this response.

In response to a request made during the March 21 personal interview, Applicants have amended the drawings to include the legend "Background Art" in Figure 5. Moreover, Applicants have amended the specification to correct a typographical error discovered by Applicants during preparation of this amendment.

Turning now to the merits, Applicants' invention is directed to a fastener and method for fastening components or objects of a plasma processing chamber. As described in the background section of Applicants' specification, plasma processing components/objects have been fastened by use of a threaded fastener extending through the first and second objects and engaging a mating part to hold the objects together in a conventional fashion as shown in Figure 5, for example. As also shown in Figure 5, conventional fasteners joining two parts of a plasma processing chamber were enclosed in a recess of an object by a plasma shield in order to protect the fastener from erosion. As discussed in the March 21st interview, use of a threaded fastener and mating part, as well as a plasma shield caused difficulty in removing the fastener to disconnect the objects, resulting in the consuming maintenance of the plasma process chamber. Applicants' invention is directed to addressing these problems.

Specifically, Applicants' Claim 1 has been amended to recite a plasma processing tool including a process chamber, first and second components positioned within the process chamber and a fastening component configured to fasten the first and second components together. The fastening component includes a first surface configured to be exposed to

plasma processing performed in the plasma processing tool, a second surface configured to contact the first component, a stem extending from the second surface and configured to at least partially protrude through the first component and the second component and a locking pin extending from at least one side of the stem and configured to contact the second component such that the first and second components are fastened together between the second surface and locking pin. Also recited is that at least one of the first surface, the second surface, the stem, and the locking pin is at least one of made of and coated with the material that is highly resistant to erosion resulting from plasma processing, and that the fastening component is not shielded from the plasma by a plasma shield component.

Thus, Applicants' independent Claim 1 has been amended to clarify that the stem and pin configuration fastening component is part of a plasma processing tool and fastens a first process chamber component and a second process chamber component together. In addition, the fastening component is not shielded from the plasma by a shield component. Independent Claims 8, 23 and 30 have been amended to include similar features. As discussed in the March 21st interview, the stem and shaft fastener provides a quick release function that reduces maintenance time for plasma process chambers. Moreover, the lack of a plasma shield allows easy access to the fastener to reduce maintenance time.

In contrast, none of the cited references show plasma processing chamber components or objects fastened together with a stem and pin type fastener that is not shielded by a plasma shield component. Specifically, the cited references to David et al. and Golden show stem and pin type fastener, but fail to show such a fastener in a plasma processing chamber environment. Although Lynn and other secondary references disclose a plasma processing chamber, none of these references teach using a stem and pin fastener to join components of the plasma processing chamber. Moreover, as discussed in the March 21, 2005 personal interview, there is no motivation whatsoever disclosed in any of the cited references to use

such a stem and pin fastener device for joining plasma processing components together. In this regard, it is well settled that discovery of the source of a problem may support patentability of an invention even though the remedy for the problem may be obvious.¹ As noted above, it is Applicants who discovered that conventional thread and mating fasteners caused unnecessary maintenance time for maintaining plasma chambers. Based on this recognition, Applicants discovered the claimed fastener, which allows for efficient removal and replacement of joint parts within a process chamber. Applicants submit that without the benefit of the problems disclosed in the present application, one of ordinary skill in the art would not be motivated to use the stem and pin configuration in a plasma processing chamber.

Even assuming for the purpose of this response that a stem and pin fastener can be combined with a plasma processing chamber based on the cited references, none of the cited references disclose the details of such a configuration without a plasma shield component as also recited in each of the independent Claims 1, 8, 23 and 30. As discussed above, prior art fastener configurations joining first and second plasma processing components have included a shield component to shield the fastening component from a plasma of the processing chamber in order to prevent erosion of the fastener. However, such a shield component also causes difficulty to remove the fastener and separating the first and second plasma chamber processing parts. It was also a realization of this inefficiency that caused the inventors in the present application to discover ways of removing the plasma shield component to enable more efficient removal of the fastener. The cited references to David et al., Golden and Lynn

¹ See In re Sponoble 160 USPQ 237, 243 (CCPA 1968) (“It should not be necessary for this court to point out that a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the ‘subject matter as a whole’ which should always be considered in determining the obviousness of an invention under 35 U.S.C. 103.” See also In re Antonson, 47 CCPA 740, 272 F.2d 948, 124 USPQ 132; In re Linnert, 50 CCPA 753, 309 F.2d 498, 135 USPQ 307.

et al. simply do not teach a fastener having a stem and shaft configuration joining first and second plasma processing chamber components and not having a plasma shield component.

The remaining cited references are presented in the Official Action for teaching only features in the dependent claims, and do not correct the deficiencies of David et al., Golden, and Lynn et al. discussed above. Thus, Applicants' Claims 1, 8, 23 and 30 patentably define over the cited references. Further, Claims 2-7, 9-22, 24-29 and 31-42, depending from Claims 1, 8, 23 and 30 respectively, also patentably define over the cited references. Nevertheless, Applicants note that the pending claims provide additional bases for patentability over the cited references.

Specifically, independent Claims 1, 23 and 30 also recite that the fastener includes a material that is highly resistant to erosion resulting from plasma processing. As discussed in the March 21st personal interview, Lynn et al. is cited only generally for coating components of a plasma process chamber. That is, Lynn et al. merely discloses the broad concept of coating any exposed parts of a plasma processing chamber including nuts and bolts, but does not specifically disclose coating a fastener having a stem and pin configuration as required by the amended claims. Thus, one of ordinary skill in the art would not be motivated to coat the pin and shaft configuration fastener with the coating disclosed in Lynn. This is particularly true in view of the fact that fasteners joining two plasma processing chamber components together are typically covered with a plasma shield as discussed above.

Finally, Applicants note that Claims 44-48 have been added to depend from Claims 1, 8, 23 and 30 respectively, and to recite that the first and second process chamber components or objects are a lower plate of an upper electrode and a gas inject plate respectively. As also discussed in the March 21st personal interview, these features are not disclosed in any of the cited references.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Steven P. Weihrouch
Registration No. 32,829

Edwin D. Garlepp
Registration No. 45,330

IN THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 5. This sheet, which includes Fig. 5, replaces the original sheet including Fig. 5.

Attachment: Replacement Sheet